**Problem analysis**

**Problem specification**

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| **Client:** | * The coordinator of the Department of Transformation and Improvement from Universidad Icesi. |
| **Users:** | * Employees from the department of Transformation and Improvement in Universidad Icesi. * Representants of every other department inside Universidad Icesi. |
| **Functional requirements:** | * Req#1: Register a collaborator from Universidad Icesi * Req#2: Register a department from Universidad Icesi. * Req#3: Register a project request. * Req#4: Change the status of a request. * Req#5: Create a Knowledge Management project. * Req#6: Create a Transformation/Improvement project. * Req#7: Close a project. * Req#8: Display the information of the projects in matrix form. * Req#9: Access the detailed information of a project. * Req#10: Review the efficiency of a collaborator from the Department of Transformation and Improvement * Req#11: Review the efficiency of a determined project. * Req#12: Review the efficiency of a request. * Req#13: Consult the number of projects by type and priority. * Req#14: Consult the number of projects led by every collaborator in the Department of Transformation and Improvement. * Req#15: Consult the number of received requests and managed in a given month. * Req#16: Generate test objects. |
| **Context of the problem:** | * Universidad Icesi has an appointed Department of Transformation and Improvement which focuses on receiving requests for institutional projects or creating new projects, advising, managing all the appropriate information so the university can improve in an orderly and standardized fashion. Currently the Department faces a problem regarding its organization and management of requests and projects, so it looks for a program that relieves this stress. * The coordinator of the Department of Transformation and Improvement wants his employees (and the rest of collaborators in the university) to utilize the program to manage all the information regarding requests, projects, and statistics. A collaborator should be able do register a request and a worker from the Department should be able to change the status request, make a project, close the project, and some other functionalities. The program should also allow the users to check efficiency indicators regarding requests, projects or collaborators enrolled inside the Department of Transformation and Improvement. * The program should work with a simple menu that multiple users can easily understand and utilize properly. It must be able to handle a big amount of information but maintain a high level of organization and coherence. |
| **Nonfunctional requirements:** | * Interoperability: The program should be able to handle multiple users at a time. * High usability: The program should use a menu that makes it easy to understand while entering, editing, or consulting information. * High availability: The program should be working 24/7 and outage risks mitigated. |

**Requirement specifications**

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| **Identifier and Name:** | Req#1: Register a collaborator from Universidad Icesi. | | |
| **Summary:** | The system will allow the user to register a new collaborator by taking the mandatory (ID, full name, etc.) and optional information (extension number) to create the appropriate instance of a collaborator. To create the collaborator, it must be specified if it is either a general collaborator or a specific one from the Department of Transformation and Improvement. Afterwards, the system will check if the entered collaborator was already registered before and display a “duplicate” message in case it happens. If any other error were to occur, the system will display an invalid information, incomplete information or a general error message. | | |
| **Inputs** | **Input name** | **Data Type** | **Conditions for valid values** |
| Collaborator Type | int | * The user must select one of the following options:   1. General Collaborator   2. Transformation and Improvement Collaborator * Mandatory |
| ID | String | * Mandatory |
|  | Full Name | String | * Mandatory |
|  | Institutional email | String | * Mandatory |
|  | Extension number | String | * Optional |
| **Results or postcondition** | A new collaborator is registered with all the mandatory information (adding the extension number if it is filled) and a success message is printed. If a collaborator with the same ID was already registered, a “no duplicate” message will be printed. If there any other error occurs within the process because of incomplete information, invalid information or any other general error, the appropriate error message will be displayed. | | |
| **Outputs** | **Output Name** | **Data type** | **Format** |
| Successful registration | String | A message stating that the collaborator was successfully registered, stating which type was just registered. |
| Duplicate collaborator | String | A message displaying that a collaborator with the entered ID has already been registered. |
| Error | String | A message stating there was an error of unknown cause that didn't allow the community to be registered will be printed. |
| Incomplete information | String | A message stating that not all the mandatory fields where filled will be printed. |
| Invalid information | String | A message stating that there are mistakes in the inputted information (don’t follow the conditions). |

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| **Identifier and Name:** | Req#2: Register a department from Universidad Icesi | | |
| **Summary:** | The system facilitates the registration of a new department by allowing users to input essential details such as the department's name, address, internal code, and select a responsible collaborator from a menu displaying registered collaborators. In case there are no preregistered collaborators to select from the list an “at least one collaborator” message will be printed. Upon submission, the program checks to ensure the department being registered doesn't already exist in the system. If a duplicate entry is detected, a clear "duplicate" message is promptly displayed, alerting the user to the existing registration. If any provided information is deemed invalid or incorrect, the user is notified with an appropriate error message. Additionally, should any unforeseen errors occur during the registration process a general error message is presented to the user. Finally, upon successful registration without encountering any errors, the system confirms the successful addition of the new department. | | |
| **Inputs** | **Input name** | **Data Type** | **Conditions for valid values** |
| Address | String | * Mandatory |
|  | Responsible Collaborator | int | * The user must enter one of the numbers that is displayed representing one of the names of the preregistered collaborators. * Mandatory |
|  | Department’s name | String | * Mandatory |
|  | Internal Code | String | * Mandatory |
| **Results or postcondition** | The system allows you to register a new department using the name, address, internal code, and a responsible collaborator. The responsible collaborator should be selected from a menu displaying the names of the registered collaborators. If there are no collaborators preregistered an “at least one collaborator” message will be printed. Afterwards, the program will check if the Department has already been registered before, displaying a “duplicate” message in case it had been done. If any other additional errors occur an invalid, incorrect information or general error message will be printed. | | |
| **Outputs** | **Output Name** | **Data type** | **Format** |
| Successful Registration | String | A message stating that the department was registered successfully will be printed. |
| At least one collaborator | String | A message stating that to register a department there must be at least one collaborator preregistered. |
| Duplicate Department | String | A message stating that the department with the entered internal code had already been registered will be printed. |
| Error | String | A message stating there was an error of unknown cause that didn't allow the community to be registered will be printed. |
| Incomplete information | String | A message stating that not all the mandatory fields where filled will be printed. |
| Invalid information | String | A message stating that there are mistakes in the inputted information (don’t follow the conditions) |

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| **Identifier and Name:** | Req#3: Register a project request | | |
| **Summary:** | The program enables a collaborator to initiate a new request by providing the subject, description, and selecting a collaborator from a menu. If no collaborator is assigned to a department, it displays a 'no eligible collaborator' message. It then checks for any existing requests with the same subject in the collaborator's projects to prevent duplicates, showing a message if found. Upon successful validation, it assigns a unique ID, registration date matching the time of the request and automatically makes its status “pending”. If there are any errors or missing information, it prompts a message detailing the issue. In case of any other errors, it shows a general error message. | | |
| **Inputs** | **Input name** | **Data Type** | **Conditions for valid values** |
| Subject | String | * Mandatory |
|  | Description | String | * Mandatory |
|  | Collaborator’s Name | Int | * The user must enter one of the numbers that is displayed representing one of the names of the preregistered collaborators. * Mandatory |
| **Results or postcondition** | The program will register a new request done by a collaborator taking the subject, description, and the collaborator (selected from a small menu displaying the names of the preregistered collaborators with an assigned department). If there is not at least one collaborator with an assigned department a “no eligible collaborator” message will be shown. Afterwards, the subject will be used to check if there is any other request with the same topic inside the projects done by that collaborator. If both filters are passed, the new request will be assigned a new unique ID, a date of registration (which will be the one the system provides at the time of registration) and it sets its status to “pending”. If there any other errors that have to do with invalid or incomplete information or any other general error, the system will display an appropriate message. | | |
| **Outputs** | **Output Name** | **Data type** | **Format** |
| Successful registration | String | A message stating that the request was registered successfully will be printed along with the unique ID. |
| No eligible collaborator | String | A message stating that to send a request there should be at least one collaborator that is already assigned to one department must already exist will be shown. |
| Duplicate request | String | A message showing that that a request with that subject had already been registered previously by that collaborator will pop up. |
| Error | String | A message stating there was an error of unknown cause that didn't allow the community to be registered will be printed. |
| Incomplete information | String | A message stating that not all the mandatory fields where filled will be printed. |
| Invalid information | String | A message stating that there are mistakes in the inputted information (don’t follow the conditions) |

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| **Identifier and Name:** | Req#4: Change the status of a request. | | |
| **Summary:** | The system presents a list of all registered projects, showing their IDs and subjects so the user selects one from the list. If no requests are preregistered, it displays an 'at least one request' message. Once a request is selected, a menu with two status change options appears (can only pick one option). After the status change, a message confirms the successful update. If there's an error due to invalid or incomplete info, or any other issue, the system shows the appropriate message. | | |
| **Inputs** | **Input name** | **Data Type** | **Conditions for valid values** |
| Request ID | int | * The user must enter one of the numbers that is displayed representing one of the ID and the subject of a request. * Mandatory |
|  | Status change | int | * A number from the following options must be selected:   1. Accepted   2. Rejected * Mandatory |
| **Results or postcondition** | The system will display the ID and the subject of all the registered projects and the user will have to select one of the displayed options. If there were no preregistered request an “at least one request” message will be shown. If there is at least one request, then, a menu showing the two possible options for status change will appear so that the user can select one of the two. Finally, a message displaying that the status of a request has been changed successfully. If an error related to invalid or incomplete information or any other general error the appropriate message will appear depending on the case. | | |
| **Outputs** | **Output Name** | **Data type** | **Format** |
| Successfully changed the status | String | A message stating that the status from the request was changed successfully will be printed. |
| At least one request | String | A message saying that there should be at least one existing request will be shown. |
| Error | String | A message stating there was an error of unknown cause that didn't allow the community to be registered will be printed. |
| Incomplete information | String | A message stating that not all the mandatory fields where filled will be printed. |
| Invalid information | String | A message stating that there are mistakes in the inputted information (don’t follow the conditions) |

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| **Identifier and Name:** | Req#5: Create a Knowledge Management project. | | |
| **Summary:** |  | | |
| **Inputs** | **Input name** | **Data Type** | **Conditions for valid values** |
|  |  | * Mandatory |
| **Results or postcondition** |  | | |
| **Outputs** | **Output Name** | **Data type** | **Format** |
| Success | String | A message stating that the community was registered successfully will be printed. |
| Error | String | A message stating there was an error of unknown cause that didn't allow the community to be registered will be printed. |
| Incomplete information | String | A message stating that not all the mandatory fields where filled will be printed. |
| Invalid information | String | A message stating that there are mistakes in the inputted information (don’t follow the conditions) |

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| **Identifier and Name:** | Req#6: Create a Transformation/Improvement project | | |
| **Summary:** |  | | |
| **Inputs** | **Input name** | **Data Type** | **Conditions for valid values** |
|  |  | * Mandatory |
| **Results or postcondition** |  | | |
| **Outputs** | **Output Name** | **Data type** | **Format** |
| Success | String | A message stating that the community was registered successfully will be printed. |
| Error | String | A message stating there was an error of unknown cause that didn't allow the community to be registered will be printed. |
| Incomplete information | String | A message stating that not all the mandatory fields where filled will be printed. |
| Invalid information | String | A message stating that there are mistakes in the inputted information (don’t follow the conditions) |

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| **Identifier and Name:** | Req#7: Close a project | | |
| **Summary:** |  | | |
| **Inputs** | **Input name** | **Data Type** | **Conditions for valid values** |
|  |  | * Mandatory |
| **Results or postcondition** |  | | |
| **Outputs** | **Output Name** | **Data type** | **Format** |
| Success | String | A message stating that the community was registered successfully will be printed. |
| Error | String | A message stating there was an error of unknown cause that didn't allow the community to be registered will be printed. |
| Incomplete information | String | A message stating that not all the mandatory fields where filled will be printed. |
| Invalid information | String | A message stating that there are mistakes in the inputted information (don’t follow the conditions) |

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| **Identifier and Name:** | Req#8: Display the information of the projects in matrix form | | |
| **Summary:** |  | | |
| **Inputs** | **Input name** | **Data Type** | **Conditions for valid values** |
|  |  | * Mandatory |
| **Results or postcondition** |  | | |
| **Outputs** | **Output Name** | **Data type** | **Format** |
| Success | String | A message stating that the community was registered successfully will be printed. |
| Error | String | A message stating there was an error of unknown cause that didn't allow the community to be registered will be printed. |
| Incomplete information | String | A message stating that not all the mandatory fields where filled will be printed. |
| Invalid information | String | A message stating that there are mistakes in the inputted information (don’t follow the conditions) |

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| **Identifier and Name:** | Req#9: Access the detailed information of a project. | | |
| **Summary:** |  | | |
| **Inputs** | **Input name** | **Data Type** | **Conditions for valid values** |
|  |  | * Mandatory |
| **Results or postcondition** |  | | |
| **Outputs** | **Output Name** | **Data type** | **Format** |
| Success | String | A message stating that the community was registered successfully will be printed. |
| Error | String | A message stating there was an error of unknown cause that didn't allow the community to be registered will be printed. |
| Incomplete information | String | A message stating that not all the mandatory fields where filled will be printed. |
| Invalid information | String | A message stating that there are mistakes in the inputted information (don’t follow the conditions) |

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| **Identifier and Name:** | Req#10: Review the efficiency of a collaborator from the Department of Transformation and Improvement | | |
| **Summary:** |  | | |
| **Inputs** | **Input name** | **Data Type** | **Conditions for valid values** |
|  |  | * Mandatory |
| **Results or postcondition** |  | | |
| **Outputs** | **Output Name** | **Data type** | **Format** |
| Success | String | A message stating that the community was registered successfully will be printed. |
| Error | String | A message stating there was an error of unknown cause that didn't allow the community to be registered will be printed. |
| Incomplete information | String | A message stating that not all the mandatory fields where filled will be printed. |
| Invalid information | String | A message stating that there are mistakes in the inputted information (don’t follow the conditions) |

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| **Identifier and Name:** | Req#11: Review the efficiency of a determined project | | |
| **Summary:** |  | | |
| **Inputs** | **Input name** | **Data Type** | **Conditions for valid values** |
|  |  | * Mandatory |
| **Results or postcondition** |  | | |
| **Outputs** | **Output Name** | **Data type** | **Format** |
| Success | String | A message stating that the community was registered successfully will be printed. |
| Error | String | A message stating there was an error of unknown cause that didn't allow the community to be registered will be printed. |
| Incomplete information | String | A message stating that not all the mandatory fields where filled will be printed. |
| Invalid information | String | A message stating that there are mistakes in the inputted information (don’t follow the conditions) |

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| **Identifier and Name:** | Req#12: Review the efficiency of a request | | |
| **Summary:** |  | | |
| **Inputs** | **Input name** | **Data Type** | **Conditions for valid values** |
|  |  | * Mandatory |
| **Results or postcondition** |  | | |
| **Outputs** | **Output Name** | **Data type** | **Format** |
| Success | String | A message stating that the community was registered successfully will be printed. |
| Error | String | A message stating there was an error of unknown cause that didn't allow the community to be registered will be printed. |
| Incomplete information | String | A message stating that not all the mandatory fields where filled will be printed. |
| Invalid information | String | A message stating that there are mistakes in the inputted information (don’t follow the conditions) |

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| **Identifier and Name:** | Req#13: Consult the number of projects by type and priority | | |
| **Summary:** |  | | |
| **Inputs** | **Input name** | **Data Type** | **Conditions for valid values** |
|  |  | * Mandatory |
| **Results or postcondition** |  | | |
| **Outputs** | **Output Name** | **Data type** | **Format** |
| Success | String | A message stating that the community was registered successfully will be printed. |
| Error | String | A message stating there was an error of unknown cause that didn't allow the community to be registered will be printed. |
| Incomplete information | String | A message stating that not all the mandatory fields where filled will be printed. |
| Invalid information | String | A message stating that there are mistakes in the inputted information (don’t follow the conditions) |

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| **Identifier and Name:** | Req#14: Consult the number of projects led by every collaborator in the Department of Transformation and Improvement | | |
| **Summary:** |  | | |
| **Inputs** | **Input name** | **Data Type** | **Conditions for valid values** |
|  |  | * Mandatory |
| **Results or postcondition** |  | | |
| **Outputs** | **Output Name** | **Data type** | **Format** |
| Success | String | A message stating that the community was registered successfully will be printed. |
| Error | String | A message stating there was an error of unknown cause that didn't allow the community to be registered will be printed. |
| Incomplete information | String | A message stating that not all the mandatory fields where filled will be printed. |
| Invalid information | String | A message stating that there are mistakes in the inputted information (don’t follow the conditions) |

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| **Identifier and Name:** | Req#15: Consult the number of received requests and managed in a given month | | |
| **Summary:** |  | | |
| **Inputs** | **Input name** | **Data Type** | **Conditions for valid values** |
|  |  | * Mandatory |
| **Results or postcondition** |  | | |
| **Outputs** | **Output Name** | **Data type** | **Format** |
| Success | String | A message stating that the community was registered successfully will be printed. |
| Error | String | A message stating there was an error of unknown cause that didn't allow the community to be registered will be printed. |
| Incomplete information | String | A message stating that not all the mandatory fields where filled will be printed. |
| Invalid information | String | A message stating that there are mistakes in the inputted information (don’t follow the conditions) |

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| **Identifier and Name:** | Req#16: Generate test objects | | |
| **Summary:** |  | | |
| **Inputs** | **Input name** | **Data Type** | **Conditions for valid values** |
|  |  | * Mandatory |
| **Results or postcondition** |  | | |
| **Outputs** | **Output Name** | **Data type** | **Format** |
| Success | String | A message stating that the community was registered successfully will be printed. |
| Error | String | A message stating there was an error of unknown cause that didn't allow the community to be registered will be printed. |
| Incomplete information | String | A message stating that not all the mandatory fields where filled will be printed. |
| Invalid information | String | A message stating that there are mistakes in the inputted information (don’t follow the conditions) |